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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2004/0141262 A1**  
Takahashi et al. (43) **Pub. Date: Jul. 22, 2004**(54) **MAGNETORESISTIVE SENSOR INCLUDING  
MAGNETIC DOMAIN CONTROL LAYERS  
HAVING HIGH ELECTRIC RESISTIVITY,  
MAGNETIC HEAD AND MAGNETIC DISK  
APPARATUS**(76) Inventors: **Hiromasa Takahashi**, Hachioji (JP);  
**Reiko Arai**, Kokubunji (JP); **Susumu  
Soeya**, Kodaira (JP)

Correspondence Address:

**ANTONELLI, TERRY, STOUT & KRAUS,  
LLP  
1300 NORTH SEVENTEENTH STREET  
SUITE 1800  
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**ABSTRACT**

There are provided a magnetoresistive sensor of the type of flowing a signal sensing current perpendicular to the plane to improve resolution at reproducing a signal, a magnetic head using the magnetoresistive sensor, and a magnetic disk apparatus.

A magnetoresistive sensor comprising a substrate, a pair of magnetic shield layers consisting of a lower magnetic shield layer and an upper magnetic shield layer, a magnetoresistive sensor layer, disposed between the pair of magnetic shield layers, an electrode terminal for flowing a signal current perpendicular to the plane of the magnetoresistive sensor layer, and magnetic domain control layers for controlling Barkhausen noise of the magnetoresistive sensor layer, wherein the magnetic domain control layers disposed in contact with opposite ends of the magnetoresistive sensor layer consist of a material having high electric resistivity and with a specific resistance not less than 10 mΩcm so as to give the magnetoresistive sensor having excellent reproducing resolution. The sensor is used to provide a magnetic head having excellent reproducing resolution and a magnetic disk apparatus.

